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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/917,958	07/30/2001	Eric Lawrence Barsness	ROC920010091US1	9346

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EXAMINER

SHRADER, LAWRENCE J

ART UNIT

PAPER NUMBER

2124

DATE MAILED: 08/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/917,958	<b>Applicant(s)</b> BARSNESS ET AL.	
	<b>Examiner</b> Lawrence Shrader	<b>Art Unit</b> 2124	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 30 July 2001.
- 2a) ☐ This action is **FINAL**.      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3, 4, 6, 8, 9; 12, 14, 15; 16, 18, 19; 20, 23, 24, 26, 28, 29; 32, 35, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hicks et al., U.S. Patent 6,175,956 (hereinafter referred to as Hicks), in view of Brandes, U.S. Patent 5,946,484, and further in view of Percival et al., U.S. Patent 6,226,652 (hereinafter referred to as Percival).

#### **In regard to claim 1:**

*"generating an optimized source code for an original source code;"*

Hicks discloses the optimization of original source code before generating the object code (column 4, lines 3 – 33), but does not disclose generating an optimized source code. However, Brandes discloses generating source code from object code (column 1, lines 39 – 50). If the object code is optimized, then the recovered source code would be inherently optimized. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to combine the source code optimized of Hicks with the source code generator of Brandes, because the combination provides the capability to recover source code to thoroughly analyze the source code in order to

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rewrite or make changes (e.g., after optimization) as taught by Brandes at column 1, lines 9 – 31.

*"displaying the optimized source code on an output device to visually indicate a change performed to the original source code in accordance to a compiler optimization."*

Hicks does not disclose displaying the source code on an output device to visually indicate a change to the original code. However, Percival discloses a visual display of file information indicating highlighted differences (column 4, lines 3 – 4; Figures 3 – 9). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to combine the generation of optimized source code as taught by Hicks combined with Brandes with the visual output display taught by Percival, because Percival discloses a way to compare files as taught at column 4, lines 5 – 7 and the combination allows the changed performed to the code to be displayed comparing the difference before and after the optimization.

**In regard to claim 3**, incorporating the rejection of claim 1:

*"...wherein the optimized source code comprises a decompiled version of an object code generated from the original source code."*

Hicks discloses the optimization of original source code before generating the object code (column 4, lines 3 – 33), but does not disclose generating an optimized source code. However, Brandes discloses generating source code from object code (column 1, lines 39 – 50). If the object code is optimized, then the recovered source code would be inherently optimized. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to combine the source code optimized of Hicks with the source code generator of Brandes, because the combination provides the

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capability to recover source code to thoroughly analyze the source code in order to rewrite or make changes (e.g., after optimization) as taught by Brandes at column 1, lines 9 – 31.

**In regard to claim 4**, incorporating the rejection of claim 1:

*"...wherein the original source code is compiled according to a compiler optimization comprising at least one of an inlining optimization, a common subexpression elimination, a loop invariant code removal, and a dead code elimination."*

Hicks discloses inlining optimization at column 1, lines 58 – 62 and column 2, lines 12 – 13.

**In regard to claim 6**, incorporating the rejection of claim 1:

*"...wherein the original source code comprises a bytecode generated using a Java compiler."*

Hicks discloses the original source code comprising a bytecode generated using a Java compiler (Figure 1; column 1, lines 14 – 27).

**In regard to claim 8**, incorporating the rejection of claim 1:

*"...wherein the optimized source code and the original source code are simultaneously displayed in separate windows of a user interface on the output device."*

Hicks discloses the optimization of original source code before generating the object code (column 4, lines 3 – 33), but neither Hicks nor Brandes discloses simultaneously displaying the original source code and optimized source code on an output device to visually indicate a change to the original code. However, Percival discloses a visual display of file information indicating highlighted differences (column 4, lines 3 – 4; Figures 3 – 9) between files. Therefore, it would have been obvious to one

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skilled in the art at the time the invention was made to combine the generation of optimized source code as taught by the combination of Hicks and Brandes, and further combined with the visual output display taught by Percival, because Percival discloses a way to compare files as taught at column 4, lines 5 – 7 and the combination allows the changed performed to the code to be displayed comparing the difference before and after the optimization.

**In regard to claim 9**, incorporating the rejection of claim 1:

*"...wherein displaying comprises:*

*identifying a difference between the original source code and the optimized source code, where the difference is due to the compiler optimization on the original source code to generate the optimized source code; and*

*highlighting the differences on a user interface on the output device."*

Hicks discloses the optimization of original source code before generating the object code (column 4, lines 3 – 33), but neither Hicks nor Brandes discloses simultaneously displaying the original source code and optimized source code on an output device to visually indicate a change to the original code. However, Percival discloses a visual display of file information indicating highlighted differences (column 4, lines 3 – 4; Figures 3 – 9) between files. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to combine the generation of optimized source code as taught by the combination of Hicks and Brandes, and further combined with the visual output display taught by Percival, because Percival discloses a way to compare files as taught at column 4, lines 5 – 7 and the combination allows the changed performed to the code to be displayed comparing the difference before and after the optimization.

**In regard to claim 12:**

*"generating an object code from an original source code;*

*optimizing the object code to produce an optimized object code;*

*decompiling the optimized object code to produce an optimized source code;"*

Hicks discloses the optimization of original source code before generating the object code (column 4, lines 3 – 33), but does not disclose generating an optimized source code. However, Brandes discloses generating source code from object code (column 1, lines 39 – 50). If the object code is optimized, then the recovered source code would be inherently optimized. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to combine the source code optimized of Hicks with the source code generator of Brandes, because the combination provides the capability to recover source code to thoroughly analyze the source code in order to rewrite or make changes (e.g., after optimization) as taught by Brandes at column 1, lines 9 – 31.

*"simultaneously displaying the optimized source code and the original source code in separate windows of a user interface on an output device to visually indicate a change to the original source code as a result of the optimizing."*

Hicks discloses the optimization of original source code before generating the object code (column 4, lines 3 – 33), but neither Hicks nor Brandes discloses simultaneously displaying the original source code and optimized source code on an output device to visually indicate a change to the original code. However, Percival



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discloses a visual display of file information indicating highlighted differences (column 4, lines 3 – 4; Figures 3 – 9) between files. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to combine the generation of optimized source code as taught by the combination of Hicks and Brandes, and further combined with the visual output display taught by Percival, because Percival discloses a way to compare files as taught at column 4, lines 5 – 7 and the combination allows the changed performed to the code to be displayed comparing the difference before and after the optimization.

**In regard to claim 14**, incorporating the rejection of claim 12:

*"...wherein the original source code is compiled according to a compiler optimization comprising at least one of an inlining optimization, a common subexpression elimination, a loop invariant code removal, and a dead code elimination."*

Hicks discloses inlining optimization at column 1, lines 58 – 62 and column 2, lines 12 – 13.

**In regard to claim 15**, incorporating the rejection of claim 12:

*"...wherein simultaneously displaying comprises:*

*identifying a difference between the original source code and the optimized source code, where the difference is due to the compiler optimization on the original source code; and highlighting the differences on a user interface on the output device."*

Hicks discloses the optimization of original source code before generating the object code (column 4, lines 3 – 33), but neither Hicks nor Brandes discloses simultaneously displaying the original source code and optimized source code on an output device to visually indicate a change to the original code. However, Percival

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discloses a visual display of file information indicating highlighted differences (column 4, lines 3 – 4; Figures 3 – 9) between files. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to combine the generation of optimized source code as taught by the combination of Hicks and Brandes, and further combined with the visual output display taught by Percival, because Percival discloses a way to compare files as taught at column 4, lines 5 – 7 and the combination allows the changed performed to the code to be displayed comparing the difference before and after the optimization.

**In regard to claim 16** (an apparatus), rejected for the same reasons put forth in the rejection of claim 12 (a corresponding method).

**In regard to claim 18** (an apparatus), incorporating the rejection of claim 16, rejected for the same reasons put forth in the rejection of claim 14 (a corresponding method).

**In regard to claim 19** (an apparatus), incorporating the rejection of claim 16, rejected for the same reasons put forth in the rejection of claim 15 (a corresponding method).

**In regard to claim 20** (a computer readable medium), rejected for the same reasons put forth in the rejection of claim 1 (a corresponding method).

**In regard to claim 23** (a computer readable medium), incorporating the rejection of claim 20, rejected for the same reasons put forth in the rejection of claim 3 (a corresponding method).

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**In regard to claim 24** (a computer readable medium), incorporating the rejection of claim 20, rejected for the same reasons put forth in the rejection of claim 4 (a corresponding method).

**In regard to claim 26** (a computer readable medium), incorporating the rejection of claim 20, rejected for the same reasons put forth in the rejection of claim 6 (a corresponding method).

**In regard to claim 28** (a computer readable medium), incorporating the rejection of claim 20, rejected for the same reasons put forth in the rejection of claim 8 (a corresponding method).

**In regard to claim 29** (a computer readable medium), incorporating the rejection of claim 20, rejected for the same reasons put forth in the rejection of claim 9 (a corresponding method).

**In regard to claim 32** (a computer readable medium), rejected for the same reasons put forth in the rejection of claim 12 (a corresponding method).

**In regard to claim 35** (a computer readable medium), incorporating the rejection of claim 32, rejected for the same reasons put forth in the rejection of claim 14 (a corresponding method).

**In regard to claim 36** (a computer readable medium), incorporating the rejection of claim 32, rejected for the same reasons put forth in the rejection of claim 15 (a corresponding method).

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3. Claims 2; 13; 17; 21, 22; 33 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hicks et al., U.S. Patent 6,175,956, in view of Brandes, U.S. Patent 5,946,484, and Percival et al., U.S. Patent 6,226,652, as applied to claims 1 and 12 above, and further in view of IBM Technical Disclosure Bulletin NN9305305 (hereinafter referred to as IBM\_TDB).

**In regard to claim 2**, incorporating the rejection of claim 1:

*"...wherein generating is performed in response to a request containing a type of the compiler optimization to be applied on the original source code."*

Hicks discloses the optimization of original source code before generating the object code, but neither Hicks, Brandes, nor Percival discloses generating optimized code in response to a type of optimization to be applied to the source code. However, the IBM\_TDB discloses user specified functions that run certain optimizations, while preventing other optimizations (page 1). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to combine the generating of optimized source code as taught by Hicks combined with Brandes, and further combined with requesting one type of optimization, while preventing another type of optimization as taught by the IBM\_TDB, because the combination guarantees that certain variables are available for debugging that may otherwise not be available when the code is optimized as taught by the IBM\_TDB at the top of page 3.

**In regard to claim 13**, incorporating the rejection of claim 12:

*"...wherein generating is performed in response to a request containing a type of a compiler optimization to be applied on the original source code to generate the optimized source code."*

Hicks does not disclose generating optimized code in response to a type of optimization to be applied to the source code. However, the IBM\_TDB discloses user specified functions that run certain optimizations, while preventing other optimizations (page 1). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to combine the generating of optimized source code as taught by Hicks combined with Brandes, and further combined with requesting one type of optimization, while preventing another type of optimization as taught by the IBM\_TDB, because the combination guarantees that certain variables are available for debugging that may otherwise not be available when the code is optimized as taught by the IBM\_TDB at the top of page 3.

**In regard to claim 17** (an apparatus), incorporating the rejection of claim 16, rejected for the same reasons put forth in the rejection of claim 13 (a corresponding method).

**In regard to claim 21** (a computer readable medium), incorporating the rejection of claim 20, rejected for the same reasons put forth in the rejection of claim 2 (a corresponding method).

**In regard to claim 22** (a computer readable medium), incorporating the rejection of claim 20, rejected for the same reasons put forth in the rejection of claim 2 (a corresponding method).

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**In regard to claim 33** (a computer readable medium), incorporating the rejection of claim 32, rejected for the same reasons put forth in the rejection of claim 13 (a corresponding method).

**In regard to claim 34** (a computer readable medium), incorporating the rejection of claim 13, rejected for the same reasons put forth in the rejection of claim 13 (a corresponding method).

4. Claims 5, 7; 25 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hicks et al., U.S. Patent 6,175,956, in view of Brandes, U.S. Patent 5,946,484, and Percival et al., U.S. Patent 6,226,652, as applied to claims 4 and 6 above, and further in view of Mattson, Jr. et al., U.S. Patent 6,430,741 (hereinafter referred to as Mattson).

**In regard to claim 5**, incorporating the rejection of claim 4:

*"...wherein displaying comprises:*

*displaying a number of times a procedure call in the original source code is inlined."*

Hicks discloses inlining optimization, but does not disclose displaying the number of times a procedure call is inlined in the source code. However, Mattson discloses method to analyze a computer program and displaying the number of times various data elements have been accessed (column 10, lines 25 – 36). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the Hicks invention to optimize the original source code by inlining, with the teaching of Mattson to display the number of time a specific function occurs (e.g., metering to determine the number of times a procedure call is inlined uses the same method as determining the

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number of times a data element is accesses). This combination provides a means, based on the visual display, to modify the code based on the result or to verify correctness as taught by Mattson at column 10, lines 46 – 49.

**In regard to claim 7**, incorporating the rejection of claim 6:

*"...further comprising:*

*displaying a number of times a procedure in the original source code is executed by an interpreter of a visual machine program before being compiled by a run-time compiler of the visual machine program."*

Hicks discloses the optimization of original source code before generating the object code, but neither Hicks, Brandes, nor Percival discloses displaying the number of times a procedure in the original source code is executed by an interpreter. However, Mattson discloses method to analyze a computer program and displaying the number of times various data elements have been accessed (column 10, lines 25 – 36). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the combination of Hicks and Brandes, further combined with Shaylor to optimize the original source code by using bytecodes in a JAVA compiler, with the teaching of Mattson to display the number of time a specific function occurs (e.g., metering to determine the number of times a procedure call is inlined uses the same method as determining the number of times a procedure is compiled by a compiler). This combination provides a means, based on the visual display, to modify the code based on the result or to verify correctness as taught by Mattson at column 10, lines 46 – 49.

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**In regard to claim 25** (a computer readable medium), incorporating the rejection of claim 24, rejected for the same reasons put forth in the rejection of claim 5 (a corresponding method).

**In regard to claim 27** (a computer readable medium), incorporating the rejection of claim 26, rejected for the same reasons put forth in the rejection of claim 7 (a corresponding method).

5. Claims 10, 11; 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hicks et al., U.S. Patent 6,175,956, in view of Brandes, U.S. Patent 5,946,484, and Percival et al., U.S. Patent 6,226,652, as applied to claim 1 above, and further in view of Shrader et al., U.S. Patent Application Publication US 2003/0005349.

**In regard to claim 10**, incorporating the rejection of claim 1; and **In regard to claim 11**, incorporating the rejection of claim 10:

*"...wherein displaying comprises:*

*identifying a failed optimization on the original source code;*

*determining a reason for the failed optimization from a compiler used to optimize the source code; and*

*displaying the reason for the failed optimization."*

*"...wherein the identifying is performed in response to a user query."*

Hicks discloses the optimization of original source code before generating the object code (column 4, lines 3 – 33), but neither Hicks nor Brandes discloses identifying



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a failed optimization, determining the reason, and displaying the reason. However, Shrader discloses an analysis of an application with detection of a failed function (an authentication), determines the reason for the failures, and displays the reason at the user's request (Abstract; also paragraph [0041]). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to combine the generating of optimized source code as taught by combining Hicks and Brandes, and further combined with the identification of failure, determining a reason for failure, and displaying the reason for failure as taught by Shrader, because the combination provides a means to determine the optimization failure and offers recovery suggestions as taught by Shrader at paragraph [0042].

**In regard to claim 30** (a computer readable medium), incorporating the rejection of claim 20, rejected for the same reasons put forth in the rejection of claim 10 (a corresponding method).

**In regard to claim 31** (a computer readable medium), incorporating the rejection of claim 20, rejected for the same reasons put forth in the rejection of claim 11 (a corresponding method).

### ***Conclusion***

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lawrence Shrader whose telephone number is (703) 305-8046. The examiner can normally be reached on M-F 08:00-16:30.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kakali Chaki can be reached on (703) 305-9662. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lawrence Shrader  
Examiner  
Art Unit 2124

28 July 2004

*Kakali Chaki*

**KAKALI CHAKI  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2100**